Adsorption of Bisphenol A by granular activated carbon prepared with different silicates as binders

Cláudio Cassavela[1], Paulo Mourão[2,*], Isabel Cansado[2], José Castanheiro[2], Luís Ribeiro[3], Francesca Pagnanelli[4]

[1] Projeto LIFE BIOAs - LIFE19 ENV/IT/000512, Universidade de Évora, Évora, Portugal
[2] Universidade de Évora, Departamento de Química e Bioquímica, MED, IIFA, ECT, Évora, Portugal
[3] REQUIMTE/LAQV, Departamento de Química e Bioquímica, Faculdade de Ciências, Porto, Portugal
[4] Dipartimento di Chimica, Sapienza Università di Roma, Piazzale Aldo Moro 5, 00185, Rome, Italy

Email de correspondencia: claudiotjcassavela25@gmail.com; pamm@uevora.pt

The population growth has led to a significant increase in the production of plastic materials, namely all those related to packaging, coatings and utensils, for different purposes, and in particular those made of polycarbonate and epoxy resin. These production processes almost always involve a substance, Bisphenol A (4,4'-(propane-2,2-diyl)diphenol), whose studies have shown to have negative effects on human health [1]. These arise from its migration mainly into packaged foods, solids and liquids, and also in the processes of manufacturing, disposal and recycling, as a result of its physical and chemical degradation. Thus, the presence of this chemical substance in the environment, air or water, is a problem that must be mitigated or resolved, while these types of plastic materials are not replaced.

In this work, we explore one of the most efficient approaches, according to the literature, in these remediation processes, which is the adsorption [2], particularly when it is possible to use adsorbents from precursors of renewable origin and low commercial value, mainly by-products of biomass origin. In this case, Figure 1, we used an activated carbon (AC) of lignocellulosic origin that was agglomerated using a set of binders (Ludox® AS-40, Ludox® AM, Ludox® HS30), environmentally and economically favourable, of siliceous origin. Apart from these variables, the type of binder, the thermal conditioning of the adsorbent granules (in an inert atmosphere and under physical activation), their physical and chemical characterization, and the adsorption of bisphenol A from the aqueous phase, were studied and correlated with the kinetic aspects, temperature, pH, among others.

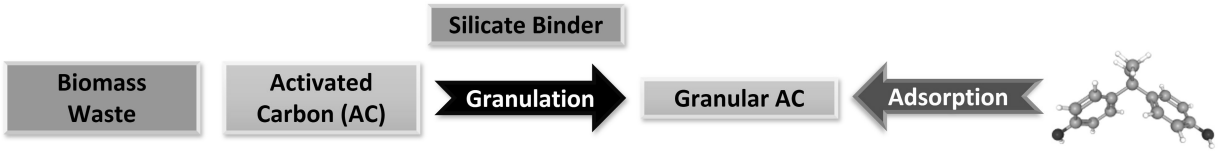

Figure 1. Process flow diagram of the preparation and use of adsorbent materials.

References:

1. https://www.efsa.europa.eu/en/topics/topic/bisphenol (accessed on 9/08/2022)
2. J. Silvestre-Albero, M. Martínez-Escandell, J. Narciso, A. Sepúlveda-Escribano, M. Molina-Sabio, The scientific impact of Francisco Rodríguez-Reinoso in carbon research and beyond, Carbon, 179 (2021) 275-287

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